



MARKSCHEME

November 2014

DESIGN TECHNOLOGY

Standard Level

Paper 2

13 pages

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General Marking Instructions

Assistant Examiners (AEs) will be contacted by their team leader (TL) through Scoris™, by e-mail or telephone – if through Scoris™ or by e-mail, please reply to confirm that you have downloaded the markscheme from IBIS. The purpose of this initial contact is to allow AEs to raise any queries they have regarding the markscheme and its interpretation. AEs should contact their team leader through Scoris™ or by e-mail at any time if they have any problems/queries regarding marking. For any queries regarding the use of Scoris™, please contact emarking@ibo.org.

1. Follow the markscheme provided, award only whole marks and mark only in **RED**.
2. Make sure that the question you are about to mark is highlighted in the mark panel on the right-hand side of the screen.
3. Where a mark is awarded, a tick/check (✓) **must** be placed in the text at the **precise point** where it becomes clear that the candidate deserves the mark. **One tick to be shown for each mark awarded.**
4. Sometimes, careful consideration is required to decide whether or not to award a mark. In these cases use Scoris™ annotations to support your decision. You are encouraged to write comments where it helps clarity, especially for re-marking purposes. Use a text box for these additional comments. It should be remembered that the script may be returned to the candidate.
5. Personal codes/notations are unacceptable.
6. Where an answer to a part question is worth no marks but the candidate has attempted the part question, use the “ZERO” annotation to award zero marks. Where a candidate has not attempted the part question, use the “SEEN” annotation to show you have looked at the question. Scoris™ will apply “NR” once you click complete.
7. If a candidate has attempted more than the required number of questions within a paper or section of a paper, mark all the answers. Scoris™ will only award the highest mark or marks in line with the rubric.
8. Ensure that you have viewed **every** page including any additional sheets. Please ensure that you stamp “SEEN” on any additional pages that are blank or where the candidate has crossed out his/her work.
9. Mark positively. Give candidates credit for what they have achieved and for what they have got correct, rather than penalizing them for what they have got wrong. However, a mark should not be awarded where there is contradiction within an answer. Make a comment to this effect using a text box or the “CON” stamp.

Subject Details: Design Technology SL Paper 2 Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions in Section A (total 20 marks) **ONE** question in Section B [20 marks]. Maximum total = 40 marks.

1. A markscheme often has more marking points than the total allows. This is intentional.
2. Each marking point has a separate line and the end is shown by means of a semicolon (;).
3. An alternative answer or wording is indicated in the markscheme by a slash (/). Either wording can be accepted.
4. Words in brackets () in the markscheme are not necessary to gain the mark.
5. Words that are underlined are essential for the mark.
6. The order of marking points does not have to be as in the markscheme, unless stated otherwise.
7. If the candidate's answer has the same "meaning" or can be clearly interpreted as being of equivalent significance, detail and validity as that in the markscheme then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect).
8. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
9. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking indicate this by adding **ECF** (error carried forward) on the script.
10. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the markscheme.

SECTION A

1. (a) (i) *Award [1] for stating as a percentage how much more efficient the Eliodomestico is in generating drinking water than the normal solar still.*
60% ; **[1]**
- (ii) *Award [1] for stating one raw material used for the ceramic parts of the Eliodomestico solar still.*
clay; **[1]**
- (iii) *Award [1] for each distinct point in an outline of why costs for the Eliodomestico still are stated as an estimate but costs for a normal still are stated as an average.*
data for the normal still is more accurate as the product has been in existence for some time;
the Eliodomestico still is a new product and the data is based on trials;
costs for local materials may vary;
not possible to give an exact price for all locations where it is sold; **[2 max]**
- (b) (i) *Award [1] for each distinct point in an outline of one way in which the Eliodomestico solar still satisfies moral responsibilities of the designer.*
no design protection/patent;
so designing to improve people's lives rather than to make money; **[2]**
- (ii) *Award [1] for each distinct point in an outline of one way in which the Eliodomestico solar still satisfies social responsibilities of the designer.*
it is designed so communities can produce it using locally-available materials/tools;
the technology is easy to understand; **[2]**
- (c) (i) *Award [1] for stating one advantage of the Eliodomestico solar still not using filters.*
cheaper;
less maintenance; **[1 max]**
- (ii) *Award [1] for each distinct point in an explanation of one limitation of the capacity of the Eliodomestico solar still for providing the clean water needs of a family.*
on some days the still may not produce five litres per day;
due to inappropriate weather conditions;
and five litres a day will not be enough for a large family; **[3]**

2. (a) *Award [1] for stating one function of the glue in a composite matrix.*
binds fibres/materials together;
fills any gaps; **[1 max]**
- (b) *Award [1] for each distinct point in an explanation of why the technique of weaving is appropriate to manufacture composite materials.*
the individual fibres are not strong;
so interlocking the fibres creates a much stronger matrix/textile;
the woven pattern can be designed to have different properties/characteristics; **[3]**
3. (a) *Award [1] for stating the type of model represented by the map.*
graphical/analogue; **[1]**
- (b) *Award [1] for each distinct point in an explanation of why the design of the map shown in Figure 3 is a distorted representation of reality.*
the map sets out features in a strict geometrical arrangement so train lines/stations can easily be identified;
but in reality it is unlikely that the trains/stations will follow such straight lines;
and the distance between the stations will vary more than shown on the map;
- the map sets out features in a strict geometrical arrangement so train lines/stations can easily be identified;
this allows all of the stations to be set out on standard size formats such as A4;
increasing the usability of the map; **[3 max]**

SECTION B

4. (a) (i) *Award [1] for a definition of robust design along the lines of:*
a flexible design that can be adapted to changing technical and market requirements; *[1]*
- (ii) *Award [1] for each distinct point in a description of how the corporate strategy of product development, may have been used for the Pure Twilight radio/lamp.*
there was already an existing market for bedside radios and lamps;
developing a new product combining both uses builds on this market; *[2]*
- (iii) *Award [1] for each distinct point in a description of how the designer of the Pure Twilight radio/lamp has attempted to balance form with function.*
use of touch-sensitive controls means that a smooth surface can be achieved;
which reinforces the curved shape of the form of the product;

the curved shape accentuates safety;
no sharp edges to injure the user when feeling for the controls during the night/half asleep; *[2 max]*
- (b) (i) *Award [1] for stating one piece of anthropometric data important to the design of the Pure Twilight radio/lamp.*
size of finger (tip); *[1]*
- (ii) *Award [1] for each distinct point in an explanation of why perception is a key factor in the research phase of the Pure Twilight radio/lamp.*
research will be based on quantitative and qualitative data;
designers will need to choose light and sound effects based on qualitative user research of people's perceptions;
designers will need to quantify the user research to decide which combinations of light and sound will create mood effects which will be popular with users;

research into psychological factors of light and sound can provide quantitative data;
but individual people's perception of the effect of these factors will be qualitative;
designers need to choose the optimum combinations of light and sound to create the mood effects; *[3 max]*

- (c) (i) *Award [1] for each distinct point in a description of the function of the light sensor for the Pure Twilight radio/lamp.*
the light levels of the room will range from no light to daylight;
the sensor will detect the light levels of the room and adjust the brightness of the display of the Pure Twilight radio/lamp accordingly; [2]
- (ii) *Award [1] for each distinct point in a discussion of how performance testing, user trials and expert appraisal may have contributed to different stages of the design development of the Pure Twilight radio/lamp. Award [3 max] per strategy.*
performance testing:
the product has multi-functions;
each function will be tested in lab conditions to ensure reliability of performance;
before decisions are made about choice of components;

user trials:
to test ease-of-use of the range of different control settings;
and impact of the mood effects;
at the prototype development stage of the process;

expert appraisal:
experts can be used to evaluate the product;
in users' reactions to psychological factors;
at various stages during the development process; [9]

5. (a) (i) *Award [1] for stating one reason why the company may wish to impose a minimum order for the Vegware tableware.*
not cost effective to package/distribute very small quantities; [1]
- (ii) *Award [1] for each distinct point in an outline of the importance of density in the choice of materials for the Vegware tableware.*
the products are likely to be used outdoors *ie* picnics/barbeques;
they need to be lightweight so people can carry them easily so appropriate materials need to be chosen; [2 max]
- (iii) *Award [1] for each distinct point in an outline of one reason why the Vegware tableware may be suitable for mass customization.*
companies/organizations could use mass customization to produce surface designs/decoration;
to fit in with the style of other products used/sold; [2]
- (b) (i) *Award [1] for a definition of variable costs.*
costs that vary with output; [1]
- (ii) *Award [1] for each distinct point in a comparison of design costs with research and development (R&D) costs for the Vegware tableware.*
low design costs as there are no special design features;
much higher R&D costs to make use of the bagasse waste fibre;
and match the material to an appropriate manufacturing technique; [3]
- (c) (i) *Award [1] for each distinct point in a description of the Vegware tableware as an example of the corporate strategy of market development.*
there is an existing market for tableware;
but the use of bagasse creates a new/different market;

being compostable capitalizes on the eco-friendly market/appeals to ecofans;
so it is a low environmental impact version of existing products; [2 max]

- (ii) *Award [1] for each distinct point in an evaluation of the environmental effects of the Vegware tableware in relation to the production, distribution and disposal stages of its product life cycle. Award [3 max] for each environmental effect.*

production:

use of recycled waste/sugar cane decreases the use of virgin raw materials;
though significant use of energy during production;
and the transportation of bagasse to the factory;

distribution:

products will need to be packaged for distribution which uses material resources;
distribution network is likely to be very large;
much energy used in getting the product to the customer;

disposal:

disposable products which normally are not good for environment;
but they are compostable;
and made from natural materials which will add nutrients to the soil;

[9]

- 6. (a) (i) *Award [1] for stating the manufacturing technique used to produce the thermoplastic seat of the chair in Figure 7.*
(injection) moulding; [1]
- (ii) *Award [1] for each distinct point in an outline of the manufacturing technique used to join the metal supports to the legs of the Eames DSW chair.*
fasteners/screw/bolts; [2]
suitable for joining metal to wood;
- (iii) *Award [2] for listing two manufacturing techniques used to produce the hardwood legs of the chair in Figure 7.*
machining (turning); [2]
abrading (sanding);
- (b) (i) *Award [1] for stating the product life cycle stage of the chair in Figure 7.*
mature; [1]
- (ii) *Award [1] for each distinct point in an explanation of why the Eames DSW chair made with a thermoplastic seat is more cost-effective than the original Eames DSW chair design with the fibreglass seat.*
thermoplastics have a much lower melting point than thermosets;
so the moulding process for the thermoplastic seat will be cheaper than for the thermoset seat;
as less energy will be needed and the process will be quicker;

fibreglass moulding is more difficult/time consuming than injection moulding;
as it involves more processes;
so it will be more expensive to undertake; [3 max]
- (c) (i) *Award [1] for each distinct point in a description of the Eames DSW chair as an example of robust design.*
the design has been adapted since the original in the 1950s;
with the use of a new plastic material for the seat and manufacturing technique; [2]

- (ii) *Award [1] for each distinct point in a discussion of the design of the Eames DSW chair in relation to planned obsolescence, fashion and consumer perceptions of quality. Award [3 max] for each aspect.*

planned obsolescence:

the chair can be disassembled to facilitate repair as fasteners have been used to join the parts together;

the materials used are durable/long-lasting;

so little planned obsolescence in the design;

fashion:

the design has stood the test of time;

it can be viewed as a classic design;

it does not follow short/quick fashion trends;

consumer perceptions of quality:

because the design has been in use for a long time;

consumers who are aware of this feel that its quality is assured;

because it is seen as a reliable design/no negative feedback;

the name “Eames” means quality to many consumers;

the designer’s reputation has been built up over many years;

and for different types of furniture;

[9 max]